



PATENT

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Customer Number: 000201
Attorney Docket No.: F7605(V)
Applicant: Flöter et al.
Serial No.: 10/045,405
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FOR: EDIBLE SPREAD CONTAINING A NATURAL FAT PHASE
UNUS No.: 01-0485-UNI

Group: 1761
Examiner: Carolyn A. Paden

Edgewater, New Jersey 07020
February 22, 2004

DECLARATION UNDER RULE 132

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

I, Eckhard Flöter, do hereby declare and state that:

1. My curriculum vitae is herewith attached describing my educational record and experience in Food and Fats technology.
2. The comparative application trials described herein were conducted under my general supervision.

In order to compare the performance of the technologies for spread preparation disclosed in US patent 4,388,339 (Lomneth) and the present patent application, a number of spreads

products containing 80% of fat were manufactured and compared in their product attributes. The assessment of the product attributes was based both on physical measurements and on human sensoric perception. The formulations of the assessed spread products only differed in the composition of the fat blend. So four fat phases have been prepared. The fat blends composition (in weight parts) and the triglycerides composition are shown in Table 1. Fat blends A1 and A2 were prepared according to US patent 4,388,339 using as structuring fat of the fat blend a mid fraction of palm oil. Fat blends B1 and B2 were prepared according to the present patent application, B1 comprising a mixture of Allanblackia fat and palm oil while B2 comprises Allanblackia fat only.

TABLE 1 **TRIACYLGLYCEROL COMPOSITION**

| Fat blend | A1: 62 parts soybean oil 38 parts palm mid fraction | A2: 54 parts soybean oil 46 parts palm mid fraction | B1: 65 parts soybean oil 15 parts allanblackia fat 20 parts palm oil | B2: 70 parts soybean oil 30 parts allanblackia fat |
|------------------|--|--|---|---|
| POP + PPO | 14 | 17 | 5.5 | <0.3 |
| POO | 12.5 | 15 | 7 | 3.5 |
| POSt | 2.5 | 3.5 | 1 | <0.3 |
| StOSt | <0.3 | <0.3 | 10.5 | 21.5 |
| StOO | 2 | 2.5 | 5 | 8 |
| PPP | 2 | 2.5 | 1 | <0.3 |
| StStSt | <0.3 | <0.3 | <0.3 | <0.3 |
| Others | 57 | 62 | 71 | 77 |

P = palmitic acid, St = stearic acid, O = oleic acid.

The triacylglycerol compositions of the four fat blends differ significantly. Particularly the specific triacylglycerols in the fraction containing one oleic acid and two long chain saturated fatty acids, either palmitic acid or stearic acid, are present in different concentrations, while the total amount of triacylglycerides in that fraction is quite similar for the four fat blends. In fat blends A1 and A2 based on palm mid fraction the majority of the long chain saturated fatty acid residue consists of palmitic acid. To the contrary stearic acid residues abound in the allanblackia fat based blends B1 and B2. To a lesser extent this phenomenon is apparent also in the triacylglycerols consisting of one saturated (P or St) and two oleic fatty acid residues.

TABLE 2

| Pre-emulsion | wt. % |
|---------------------|--------------|
| Fat blend | 80 |
| Bolec ZT | 0.32 |
| Hymono 8903 | 0.035 |
| Flavour | trace |
| B-carotene | 0.048 |
| Water | 18.6 |
| K-sorbate | 0.073 |
| Whey protein | 0.55 |
| Salt | 0.28 |
| Citric acid | 0.05 |
| End pH | 4.6 |

All fats have been purified under standard refining conditions and comply with the normal quality standards as known to the man skilled in the art.

With the four fat blends four spreads were prepared starting with a pre-emulsion having the composition shown in Table 2. The pre-emulsion was processed employing a traditional A-A-C votator sequence under the conditions listed in Table 3.

TABLE 3

| Process settings: | | | | |
|-----------------------------------|------|-----------------|-----------------|---------------|
| Premix 60°C, pump 4.2 kg/h | | | | |
| | | A-unit 1 | A-unit 2 | C-unit |
| Temp in | °C | 44 | 12 | 9 |
| Temp out | °C | 12 | 9 | 12 |
| Volume | ml | 18.3 | 18.3 | 150 |
| rpm | /min | 800 | 600 | 200 |
| Direct storage: 10°C | | | | |

Products have been stored for stabilisation at 10°C. They have been temperature cycled by exposing the spreads first to a temperature of 25°C for 24 hours and subsequently to 10°C for 4 weeks in order to mimick common use by the consumer. Prior to the actual measurement the products were equilibrated at the measurement temperature for at least 24 hours. Table 4 shows the hardness of the product after the four weeks storage expressed as Stevens values.

Table 4 further shows that in comparison with the fat blends A1 and A2 based products, products based on blends B1 and B2 have a relatively low hardness at low temperatures which implies a good spreading performance when taken from the fridge, while the relatively high hardness at high ambient temperatures implies good stability against temperature abuse.

TABLE 4

| Stevens 6.35 hardness (g) of spread | | | | |
|-------------------------------------|----------|----------|----------|----------|
| C | Blend A1 | Blend A2 | Blend B1 | Blend B2 |
| 10° | 570 | 850 | 270 | 190 |
| 20° | 68 | 90 | 91 | 160 |
| 30° | <10 | <10 | 20 | 86 |

Moreover the products containing Allanblackia fat show at increasing temperature a sharp drop in product hardness which is experienced as an excellent mouthfeel when assessed by the internal expert panel. Such sharp drop of hardness points to relatively low levels of trisaturated triacylglycerols at temperatures just below mouth temperature. It follows that the spreads according to the invention in organoleptical respect are clearly superior to the prior art products prepared with fat blends A1 and A2 which are based on palm mid fractions.

Investigation of A1 and A2 based spread products showed that these are very prone to the development of a serious product defect which is well known in the art as tropical or POP graininess and which manifests itself on storage of the spread by the growth of grainy fat agglomerates up to a size of 2 mm, even when the spread is not exposed to temperature cycling. This phenomenon is ascribed to the high content of POP triglycerides. Typically, this separation of POP triacylglyceride crystals is known to be favoured by exposure to temperature cycling of fat samples that contain significant amounts of POP. Spread products prepared with the fat blend compositions according to US patent 4,388,339 are affected by this dramatic side effect which make palm mid fraction based fat blends less suited for the manufacture of spreads. Absence of graininess both in the B1 and B2 products shows that the partial substitution of POP by StOSt in the B1 fat blend reduces the risk of POP graininess

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and prevents the appearance of said product defect throughout the shelf life of the product, which was 12 weeks in the studied case.

3. The gathered experimental evidence supports our statement that the fat compositions according to our invention as described in the present patent application, exhibit a superior performance when processed to a spread product.
4. The major difference of the B-fats compared with the A-fats is in the fraction of triacylglycerols composed of 1 oleic fatty acid residue and 2 saturated fatty acid residues, either palmitic acid or stearic acid. As a person skilled in the art of spread manufacture I would not have expected that a difference of 2 carbon atoms in one or two of those saturated fatty acid residues would have such serious impact on the decline of product hardness and on the recrystallisation behaviour as now is observed by the present inclusion of allanblackia fat in a fat blend for spread preparation.
5. All statements made herein of my own knowledge are true and all statements made on information and belief are believed to be true; and further that these statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code, and that such willful false statements may jeopardize the validity of this patent application or any patent issuing thereon.

27.02.2004

Dated



Eckhard Flöter



Curriculum Vitae

Eckhard Flöter, PhD

UNILEVER
Spreads and Cooking Products
Global Technology Centre – Vlaardingen

During my seven years of employment in Unilever Foods R&D I have primarily worked in the area of fat-based food compositions. I am the Skillbase Leader “Fat Applications and Spreads Technology” and the Lead Scientist for “Oil based Products Technology”. Building on my experience in thermodynamics and crystallisation that I acquired during graduate-school, I initially spent one year as research scientist in the area of fat crystallisation. In this role I supported several projects relating to crystallisation of fats. I was appointed Project Leader and subsequently Expertise and Theme Leader “Product Structuring and Fat Blend Formulation” in Unilever’s Foods Research.

In 1999 I was appointed Skillbase Leader “Product Characterisation & Fat Blend Formulation” in the global technology center of Unilever’s Spreads and Cooking Products category. In 2000 I was appointed the Lead Scientist in the area of oil based product technology. My responsibilities in the role as Skillbase leader further increased in 2002, comprising heading a group of more than 30 people being concerned with the design of a wide variety of fat/oil based products. During these years of increasing responsibilities I became not only an expert in said field within Unilever, but also managed to create a substantial scientific network and acquired an expert reputation in the outside world. This has become apparent by several international co-operations, numerous contacts with leading academic groups in the field and repeated invitations for addressing scientific conferences.

Furthermore, I am a member of the European and German Society of Fat Technology, EuroFedLipid and DGF, respectively. I am a member of the Scientific Advisory Board of the DGF.

Current Employment History - Unilever R&D, the Netherlands

2002 – Present Skillbase Leader “Fat Applications and Spreads Technology” and Lead Scientist, “Oil based Products Technology”, Global Technology Centre (GTC) Spreads and Cooking Products Category .

1999 – 2002 Skillbase Leader “Product Characterisation & Fat Blend Formulation”, GTC Spreads and Cooking Products Category

1997 – 1999 Expertise and Theme Leader “Product Structuring and Fatblend Formulation”, Foods Research

1996 – 1997 Research Scientist in the group of Fat Technology and Oil Processing, Foods Research

Educational Record

Doctorate 1992 – 1996 PhD in Engineering Science and Technology, University of Delft, the Netherlands, Laboratory of Applied Thermodynamics and Phase. **Thesis:** “Hyperbaric Reservoir Fluids - High Pressure Phase Equilibria of Asymmetric Hydrocarbon Systems”

Degree 1986 – 1992
Chem. Engineering, University of Berlin (West-Germany), Degree with distinction, top 3%

Publications and Patents

Numerous peer-reviewed Publications, contributions to book chapters, lectures at conferences, more than 20 patent applications.

Personal Details

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Contact Information

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